ΠΛΗΡΟΦΟΡΙΚΗ ΚΑΙ ΝΕΕΣ ΤΕΧΝΟΛΟΓΙΕΣ ΣΤΗΝ ΕΚΠΑΙΔΕΥΣΗ

ΕΡΓΑΣΙΑ 1Η

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# 2η σελίδα , περιεχόμενα1ο Ecology

Ecology (from Greek: οἶκος, "house", or "environment"; -λογία, "study of")[A] is the branch of biology[1] which studies the interactions among organisms and their environment. Objects of study include interactions of organisms with each other and with dead abiotic components of their environment. Topics of interest include the biodiversity, distribution, biomass, and populations of organisms, as well as cooperation and competition within and between species. Ecosystems are dynamically interacting systems of organisms, the communities they make up, and the non-living components of their environment. Ecosystem processes, such as primary production, pedogenesis, nutrient cycling, and niche construction, regulate the flux of energy and matter through an environment. These processes are sustained by organisms with specific life history traits. Biodiversity means the varieties of species, genes, and ecosystems, enhances certain ecosystem services.

Ecology is not synonymous with environmentalism, biological history, or environmental science. It overlaps with the closely related sciences of evolutionary biology, genetics, and ethology. A key strength focus for ecologists is to improve the understanding of how biodiversity affects ecological function. Ecologists seek to explain:

Life processes, interactions, and adaptations

The movement of materials and energy through living communities

The successional development of ecosystems

The abundance and distribution of organisms and biodiversity in the context of the environment.

Ecology has useful applications in conservation biology, wetland management, natural resource management (agroecology, agriculture, forestry, agroforestry, fisheries), city planning (urban ecology), community health, economics, basic and applied science, and human social interaction (human ecology). For example, the Circles of Sustainability approach treats ecology as more than the environment 'out there'. It is not treated as separate from humans. Organisms (including humans) and resources compose ecosystems which, in turn, maintain biophysical feedback mechanisms that moderate processes acting on living (biotic) and non-living (abiotic) components of the planet. Ecosystems sustain life-supporting functions and produce natural capital like biomass production (food, fuel, fiber, and medicine), the regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion control, flood protection, and many other natural features of scientific, historical, economic, or intrinsic value.

The word "ecology" ("Ökologie") was coined in 1866 by the German scientist Ernst Haeckel. Ecological thought is derivative of established currents in philosophy, particularly from ethics and politics.[2] Ancient Greek philosophers such as Hippocrates and Aristotle laid the foundations of

3η σελίδα , 1ο λήμμα

ecology in their studies on natural history. Modern ecology became a much more rigorous science i

the late 19th century. Evolutionary concepts relating to adaptation and natural selection became the cornerstones of modern ecological theory.

4η σελίδα , 1ο λήμμα

# 2ο Niche

Main article: Ecological niche

Termite mounds with varied heights of chimneys regulate gas exchange, temperature and other environmental parameters that are needed to sustain the internal physiology of the entire colony.[28][29]

Definitions of the niche date back to 1917,[30] but G. Evelyn Hutchinson made conceptual advances in 1957[31][32] by introducing a widely adopted definition: "the set of biotic and abiotic conditions in which a species is able to persist and maintain stable population sizes."[30]:519 The ecological niche is a central concept in the ecology of organisms and is sub-divided into the fundamental and the realized niche. The fundamental niche is the set of environmental conditions under which a species is able to persist. The realized niche is the set of environmental plus ecological conditions under which a species persists.[30][32][33] The Hutchinsonian niche is defined more technically as a "Euclidean hyperspace whose dimensions are defined as environmental variables and whose size is a function of the number of values that the environmental values may assume for which an organism has positive fitness."[34]:71

Biogeographical patterns and range distributions are explained or predicted through knowledge of a species' traits and niche requirements.[35] Species have functional traits that are uniquely adapted to the ecological niche. A trait is a measurable property, phenotype, or characteristic of an organism that may influence its survival. Genes play an important role in the interplay of development and environmental expression of traits.[36] Resident species evolve traits that are fitted to the selection pressures of their local environment. This tends to afford them a competitive advantage and discourages similarly adapted species from having an overlapping geographic range. The competitive exclusion principle states that two species cannot coexist indefinitely by living off the same limiting resource; one will always out-compete the other. When similarly adapted species overlap geographically, closer inspection reveals subtle ecological differences in their habitat or dietary requirements.[37] Some models and empirical studies, however, suggest that disturbances can stabilize the co-evolution and shared niche occupancy of similar species inhabiting species-rich communities.[38] The habitat plus the niche is called the ecotope, which is defined as the full range of environmental and biological variables affecting an entire species.[24]

5η σελίδα , 2ο λήμμα

# 3ο Biome

Main article: Biome

Biomes are larger units of organization that categorize regions of the Earth's ecosystems, mainly according to the structure and composition of vegetation.[42] There are different methods to define the continental boundaries of biomes dominated by different functional types of vegetative communities that are limited in distribution by climate, precipitation, weather and other environmental variables. Biomes include tropical rainforest, temperate broadleaf and mixed forest, temperate deciduous forest, taiga, tundra, hot desert, and polar desert.[43] Other researchers have recently categorized other biomes, such as the human and oceanic microbiomes. To a microbe, the human body is a habitat and a landscape.[44] Microbiomes were discovered largely through advances in molecular genetics, which have revealed a hidden richness of microbial diversity on the planet. The oceanic microbiome plays a significant role in the ecological biogeochemistry of the planet's oceans.[45]

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| Complex Table (less accessible)  **Class Schedule**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | LESSON | TOPIC | | ASSIGNMENT | Points | DUE | | 1 | What is Distance Learning ? | | Wiki#1 | 10 | March 10 | | Presentation | 20 |  | | 2 | History & Theories | | Brief Paper | 20 | March 24 | | **Spring Break** | | | | | | | 3 | Distance  Learners | Discussion#1 | | 10 | April 7 | | Group Project | | 50 | April 14 | | 4 | Media Selection | | Blog#1 | 10 | April 21 | |

## 4ο Biosphere



Main article: Biosphere

See also: Earth's spheres

The largest scale of ecological organization is the biosphere: the total sum of ecosystems on the planet. Ecological relationships regulate the flux of energy, nutrients, and climate all the way up to the planetary scale. For example, the dynamic history of the planetary atmosphere's CO2 and O2 composition has been affected by the biogenic flux of gases coming from respiration and photosynthesis, with levels fluctuating over time in relation to the ecology and evolution of plants and animals.[46] Ecological theory has also been used to explain self-emergent regulatory phenomena at the planetary scale: for example, the Gaia hypothesis is an example of holism applied in ecological theory.[47] The Gaia hypothesis states that there is an emergent feedback loop generated by the metabolism of living organisms that maintains the core temperature of the Earth and atmospheric conditions within a narrow self-regulating range of tolerance.[48]

7η σελίδα , λήμμα 5ο

## 5ο Individual ecology

See also: Life history theory, Ecophysiology, and Metabolic theory of ecology

Understanding traits of individual organisms helps explain patterns and processes at other levels of organization including populations, communities, and ecosystems. Several areas of ecology of evolution that focus on such traits are life history theory, ecophysiology, metabolic theory of ecology, and Ethology. Examples of such traits include features of an organisms life cycle such as age to maturity, life span, or metabolic costs of reproduction. Other traits may be related to structure, such as the spines of a cactus or dorsal spines of a bluegill sunfish, or behaviors such as courtship displays or pair bonding. Other traits include emergent properties that are the result at least in part of interactions with the surrounding environment such as growth rate, resource uptake rate, winter, and deciduous vs. drought deciduous trees and shrubs.

One set of characteristics relate to body size and temperature. The metabolic theory of ecology provides a predictive qualitative set of relationships between an organism’s body size and temperature and metabolic processes. In general, smaller, warmer organisms have higher metabolic rates and this results in a variety of predictions regarding individual somatic growth rates, reproduction and population growth rates, population size, and resource uptake rates.

The traits of organisms are subject to change through acclimation, development, and evolution. For this reason, individuals form a shared focus for ecology and for evolutionary ecology.

8η σελίδα , λήμμα 5ο

6η ΕΝΟΤΗΤΑ « Η ΟΙΚΟΓΕΝΕΙΑ ΜΟΥ »

9η σελίδα , γενεαλογικό δέντρο